United States Environmental Protection Agency New England

Community Update

Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts
August 2006

EPA Plans Modifications to Groundwater Cleanup

Introduction

The U.S. Environmental Protection Agency is proposing to alter the cleanup strategy for contaminated groundwater at the Nyanza Chemical Superfund Site in Ashland, MA. Since the interim cleanup decision was issued in a 1991, EPA has gathered additional information about the site which makes it necessary to alter the original cleanup plan to ensure the protection of human health and the environment. EPA is issuing an **"Explanation of Significant Differences"** (ESD) to provide public notice and formally document the differences from the 1991 interim Record of Decision (ROD). This document also addresses potentially unacceptable inhalation risks by eliminating exposure to vapors migrating from the more contaminated portions of the groundwater plume to the indoor air of overlying structures through the installation of vapor mitigation systems. Additional air sampling and groundwater monitoring will be performed to assess the need to install mitigation systems in other nearby buildings. EPA anticipates issuing a Final Record of Decision for groundwater in the future, following the evaluation of this effort to further remove and control contamination in the groundwater.

History

The Nyanza Superfund Site is located in Ashland, Massachusetts. The Site was used as a dye manufacturing facility from the 1910's until 1978. EPA completed various soil and sediment removal activities at the Site between 1983 and 2001 and is currently studying both the groundwater (known as Operable Unit 2 or OU2) and the down stream portions of the Sudbury River (known as OU4). More information on the site history and past cleanup actions can be found at www.epa.gov/ne/superfund/sites/nyanza .

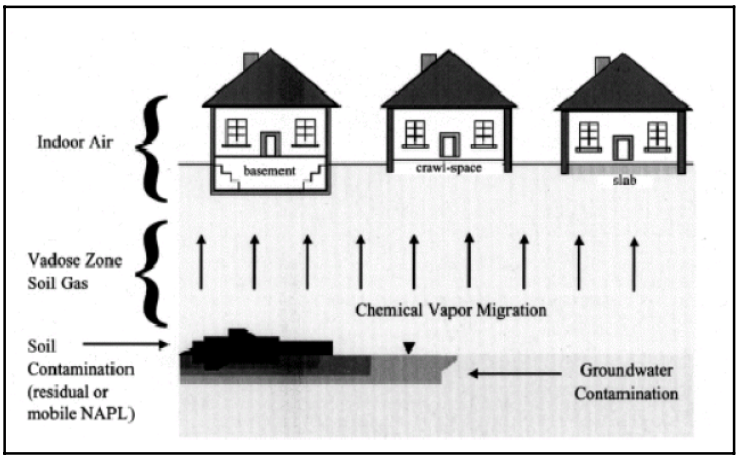
A Record of Decision for groundwater at the site was issued by EPA in 1991 as an interim remedy with the intent to further evaluate the effectiveness of groundwater extraction and treatment after an initial 5-year operational period. In 1994, a pilot-scale treatment system was constructed, which was intended to refine extraction rates and treatment processes. However, when EPA started the system, dense non-aqueous phase liquid (DNAPL) was discovered in a pump test extraction well located on the northern portion of the Site. DNAPL is highly-concentrated liquid product that has sunk to the bottom of the aquifer. It is denser and more contaminated than the groundwater. The treatment system had not been designed to handle influent containing DNAPL. As a result, the pilot-scale treatment system was not tested and the full-scale design was postponed indefinitely.

A groundwater monitoring program was initiated in 1998 to assess plume migration and any changes in contaminant concentrations and continued through 2003. The results indicate that the plume is generally stagnant, which means that contaminant concentrations have remained relatively unchanged and the overall plume is neither expanding nor contracting.

Vapor Intrusion

Some chemicals in groundwater, called volatile organic compounds or VOCs, have a tendency to transfer from the liquid phase to the vapor phase, where the vapors may then travel upward through the soil and pass through basement floors, walls, and slabs into indoor air space (figure on next page). Once inside a structure, these vapors may collect to such a point that continued inhalation of the vapors could result in unacceptable exposure risks. This

phenomenon is referred to as the vapor intrusion pathway an is illustrated in the figure below.



Elevated concentrations of certain VOCs, trichloroethene (TCE) in particular, within the contaminated groundwater prompted EPA to conduct an indoor air sampling program in 1998. The plume is present in shallow groundwater north and east of the Nyanza Site, and extends under numerous homes, businesses and municipal buildings. The objective of the sampling program was to determine if contaminants in groundwater were migrating into homes and other structures at concentrations that are measurable, and may result in potentially unacceptable inhalation risks. TCE and four other contaminants were detected in 8 of the 9) homes sampled, and at the Town Hall and police station. TCE was detected at concentrations ranging from 6.4 to 7.3 *u*g/m3 (micrograms per cubic meter), which were all below the health based screening level of 134 *u*g/m3. Therefore, these levels were determined to not pose an unacceptable inhalation risk.

Based on the TCE detections and continued elevated concentrations in groundwater, a second indoor air sampling program was conducted in 2004. TCE and four other contaminants were detected in 5 of the 7 homes sampled. The Town Hall and police station were not sampled. TCE was detected at concentrations ranging from 1.3 to 2.9 *u*g/m3, which were all below the existing health based screening level of 134 *u*g/m3. However, in 2001, EPA proposed a lower inhalation standard for TCE based on new toxicity information and EPA has continued to review available scientific information and studies along with health experts nationally. Application of the proposed toxicity information results in a screening level range of 2 to 43 *u*g/m3, which is far lower than the existing 134 *u*g/m3 screening level. Concentrations of TCE in 3 of the homes exceeded the lower end of the proposed screening range. Exceedance of the proposed screening level range prompted EPA to perform a risk assessment on all the available air data from Nyanza to determine if potentially unacceptable inhalation risks are possible using the proposed toxicity information for TCE. The risk assessment concluded that use of the proposed TCE toxicity information results in a potentially unacceptable risk from continued long-term inhalation of TCE vapors in 7 of the 14 homes sampled, and in the Town Hall. No potentially unacceptable inhalation risks are present if the existing toxicity information for TCE is used.

Description of ESD Actions

The ESD requires:

1. Extraction of DNAPL with off-site treatment and disposal.

2. Performance of routine groundwater monitoring to assess changes in plume concentrations and migration.

3. The installation, on a voluntary basis, of vapor mitigation systems in approximately 40 to 50 structures (mostly homes) located in the northeast portion of the plume, in an area generally bracketed by Tilton Avenue and Water Street to the west, the Sudbury River to the north and to the east, and the railroad tracks to the south.

4. Performance of additional air testing, on a voluntary basis, at approximately 10 to 15 additional homes and businesses located above remaining areas of the plume, generally described as areas immediate west of Forest Street and southeast of the Town Hall along Main Street. These homes and businesses have not yet been selected.

5. Installation of small diameter monitoring wells or piezometers in the areas generally described in #4 above to more accurately determine the extent of the shallow groundwater plume.

In addition, this ESD provides clarification on the use of institutional controls to prevent exposure to contaminated groundwater. These above actions, outlined in greater detail in the ESD, are summarized below.

A. Extraction of DNAPL

The plan outlined in the ESD involves the physical extraction of DNAPL through the use of belt skimmers, pumps or similar extraction methods. DNAPL will then be containerized in a tank or drums for off-site treatment. Belt-skimmers (*figure on right*) will initially be installed in 5 to 7 wells. Depending on the success of DNAPL extraction from these wells, EPA may install additional extraction wells. The location of the proposed extraction wells, and exact extraction methods to be used shall be determined during the design phase. It is expected that the belt skimmers or other extraction methods will continue to operate until no more DNAPL is recoverable or until EPA makes a final remedy decision for groundwater. If, after a reasonable period of operation not to exceed five years from system start-up, it appears that the extraction technologies are not effective, EPA may also consider enhancements of the physical extraction systems or other methods to attempt containment, removal or treatment of the DNAPL.

B. Vapor Mitigation Systems (Engineering Controls)

The ESD also provides for the installation of vapor mitigation systems in structures (primarily homes) located above the most contaminated area of the plume. This area of approximately 45 structures is generally bracketed by Tilton Avenue and Water Street to the west, the Sudbury River to the north and to the east, and the railroad tracks to the south (see figure on page 5). This area was selected because:

- Nearly all structures that were sampled for vapors in indoor air within this area exceed EPA's proposed target risk range based on inhalation of vapors.
- Concentrations of contaminants in groundwater beneath this area, particularly TCE, are the highest within the overall plume.
- Modeling suggests that all structures within this area may be susceptible to inhalation risks from vapor intrusion.

The active vapor mitigation systems consist of small diameter PVC pipes, which are attached to a continuously operated fan. The system works by installing one or more pipes through the basement floor and into the sub-slab area. The piping is then routed outside the home and above the roof line where the vapors are allowed to discharge into the atmosphere. Once discharged, the vapors are diluted and no longer pose a potential threat. A small fan is placed along the piping route (outside) to maintain a positive pressure and continually draw the vapors from the sub-slab to the atmosphere. As part of this installation, EPA may also need to seal cracks or gaps in basement walls or floors, cover any existing sump pits (while still allowing them to function), and install concrete or other vapor barrier membrane in homes with dirt basements. A diagram of a typical active vapor mitigation system is depicted below.

Typical Vapor Mitigation System

The techniques may vary for different foundations and site requirements, but the basic elements are:

A. Impermeable Barrier

A concrete floor or other suitable material is placed in dirt basements to reduce upward migration and allow a method of collecting vapors.

B. Sealing and Caulking

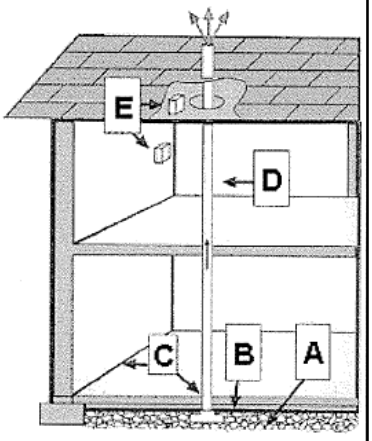
All openings and cracks in foundation floors and walls are sealed to reduce soil gas entry into the home.

D. Vent Pipe

A 2- to 4-inch gas-tight or PVC pipe (commonly used for plumbing) runs from beneath the slab or basement floor through the house to the roof to safely vent vapors above the house. Several vertical pipes may be installed through the slab or floor where placement of a horizontal pipe is not possible. The vertical portion of the pipe must often be installed outside in older homes and buildings.

E. Fan and Junction Box

An electrical junction box is installed for a small diameter electric venting fan. The fan must run continuously and is often placed outside the home.



EPA will notify property owners and occupants of structures within the proposed installation area that upon the agreement of the property owner, EPA will install an active vapor mitigation system, and thereafter MassDEP will maintain it, all at no cost to the owner. The property owner will be responsible for the cost of electricity to operate the system, estimated at approximately $3 to $10 per month (the cost of running the small fan), depending on the size of the structure and type of system. If the property owner of any structure rejects the installation of the vapor mitigation system, the government, at this time, plans no further action at that property. In such cases, EPA may file a notice letter with the Ashland Board of Health, and/or place a notice on the property's deed, documenting the rejected offer.

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C. Indoor Air Monitoring

Additional indoor air monitoring is proposed in structures located above the plume beyond the area where vapor mitigation systems are currently proposed to be installed. Systems are not proposed to be installed in these structures at this time because:

- None of the structures sampled for vapors in indoor air within these areas exceed EPA's health based screening levels.
- Limited monitoring of groundwater indicates contaminant concentrations in these areas of the plume are much lower.

However, additional sampling of indoor air is warranted because these structures are still susceptible to inhalation risks from vapor intrusion and the coverage of groundwater monitoring wells throughout the residential areas is generally limited. There are approximately 50 to 60 structures (mostly homes) located above the less-contaminated areas of the plume. EPA intends to perform a single round of indoor air sampling in 10 to 15 of these structures (roughly 20 to 30%). If results conclude that any of the structures exceed EPA's proposed health based screening levels, additional vapor mitigation systems may be installed.

D. Groundwater Monitoring

EPA will reinstitute a groundwater monitoring program to measure any impact from the recovery of DNAPL, and to track any other changes in plume configuration and migration. In addition, EPA intends to install additional monitoring wells throughout the plume area, primarily in public rights of way. The primary purpose of installing these shallow wells is to more accurately delineate the shallow VOC plume to further assess the need to perform additional indoor air sampling or install additional vapor mitigation systems. EPA anticipates starting the monitoring plan this fall or winter, with well installation to follow in the spring of 2007.

E. Institutional Controls

Engineering controls through the installation of vapor mitigation systems will address potential inhalation risks. The only other exposure concern with regard to the contaminated groundwater plume is potential consumption or incidental ingestion of groundwater. While there are no formal controls currently in place to prevent the installation of drinking water wells or contact with contaminated groundwater through excavation (i.e., deed restrictions or zoning bylaws), informal procedures have been established whereby local officials continue to work closely with EPA and MassDEP to ensure that no drinking water wells are installed in or near the plume area, and that all construction activities that involve excavation, including the repair or installation of utilities, do not involve handling of contaminated groundwater. Similar safeguards may also be required to restrict new construction in the area of potential vapor intrusion risk unless the construction includes measures to mitigate this risk. EPA and MassDEP will work with local officials, through the Board of Health and Building Department, to put in place appropriate ordinances and/or regulations that will formalize this process and create the necessary regulatory framework to ensure adequate protection of public health

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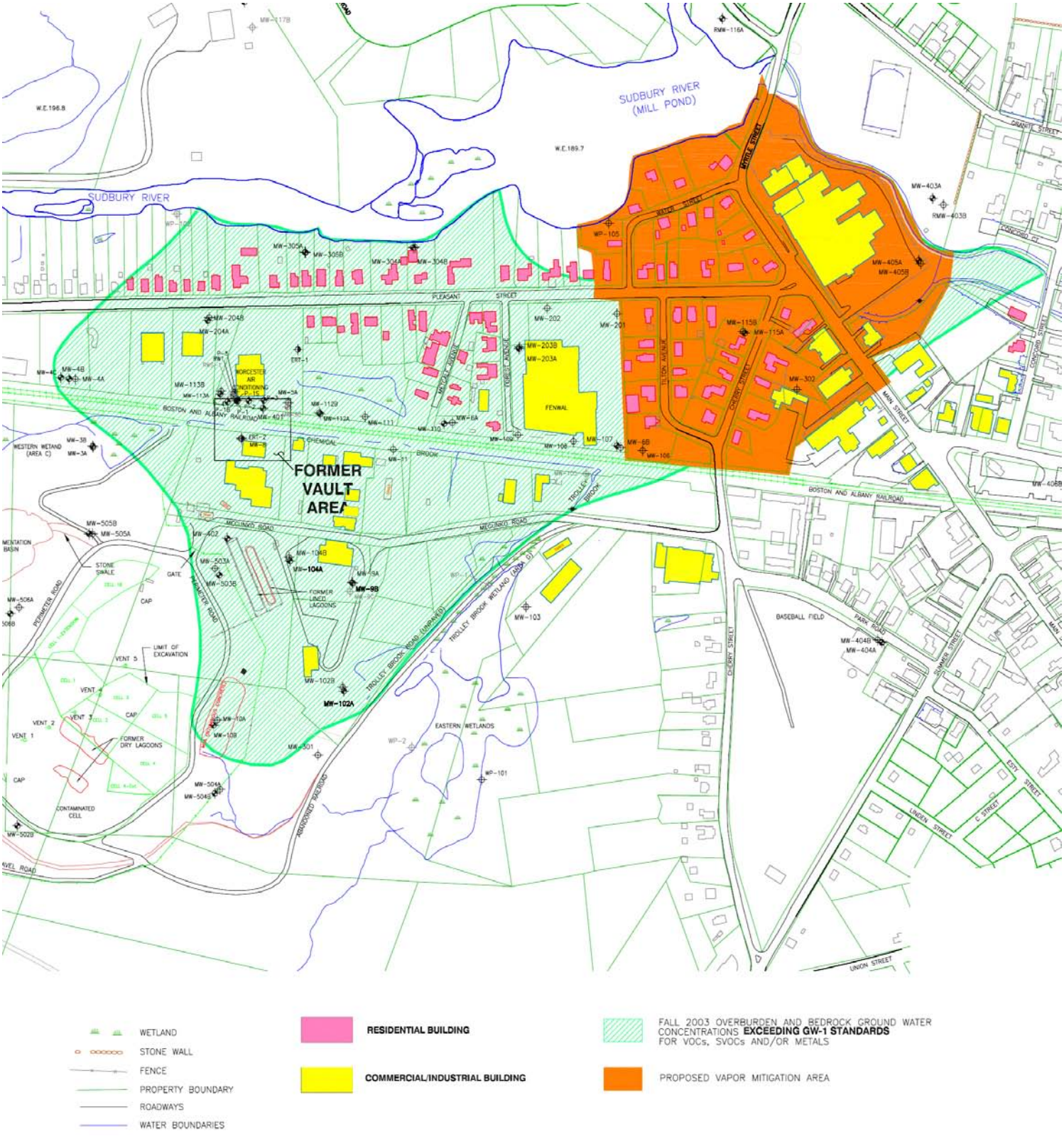

Proposed Vapor Mitigation Area
Nyanza Superfund Site - Ashland, Massachusetts

Dark shaded area = area for installation of vapor mitigation systems
Light shaded area = area for addtional indoor air and groundwater sampling

Availability of the Explanation of Significant Differences for Public Review

EPA is accepting public comment on the ESD cleanup proposals from **August 23, 2006 through September 22, 2006.** If you have a concern or preference regarding EPA's proposals, then EPA and the Massachusetts Department of Environmental Protection want to hear from you before making a final decision on how to protect your community.

This ESD and supporting documentation will become part of the Administrative Record for the Site. The full Administrative Record, including its index, is available to the public at the following locations and may be reviewed during the times listed:

U.S. Environmental Protection Agency
Records Center
One Congress Street
Boston, MA 02114
(617) 918-1440
Monday through Friday 9:00 am. to 5:00 pm.

Ashland Public Library
66 Front Street
Ashland, MA 01721
(508) 881- 0134
SUMMER HOURS - Tuesday through Thursday 10:00 am to 8:00 pm. Friday 2:00 pm to 5:00 pm. Saturday 10:00 am to 5:00 pm.

This ESD and other key documents are also available for review on the internet at **www.epa.gov/region1/superfund/sites/nyanza**. You will need Adobe Reader to view the documents.

EPA encourages you to provide your written comments and ideas about the plans for addressing the groundwater contamination at the Nyanza Superfund Site. You can mail or email written comments to:

Jim DiLorenzo, Project Manager
EPA New England
1 Congress Street, Suite 1100 (HBO)
Boston, MA 02114 - 2023
E-mail: dilorenzo.jim@epa.gov

If you have questions about how to comment on the ESD, please call Jim Murphy of EPA's Community Affairs Office at 617-918-1028 or toll free at 1-888-372-7341, extension 81028. Written comments must be postmarked (in the case of U.S. Mail) or received (in the case of E-mail) no later than September 22, 2006.

If you have any questions or want additional information about EPA's work at Nyanza, please contact:

Jim DiLorenzo,	EPA Project Manager	Jim Murphy,	EPA Community Involvement
Phone:	617-918-1247	Phone:	617-918-1028
Email:	dilorenzo.jim@epa.gov	Email:	murphy.jim@epa.gov
Dave Buckley,	MassDEP Project Manager		
Phone:	617-556-1184		
Email:	david.buckley@state.ma.us		

EPA New England website for Nyanza
www.epa.gov/ne/superfund/sites/nyanza